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PROVISIONAL SPECIFICATION.

Improvements in Securing Devices for Removable Bridge Work and similar Use in Dentistry.

A communication from abroad by William Everett Griswold of 423 Mack Block, Denver, Arapahoe County, Colorado, Dentist and Louis Dennison Sweet, of Equitable Building, Denver, Arapahoe County aforesaid Capitalist.

I, William Lloyd Wise, of 46, Lincoln's Inn Fields, in the County of London, Consulting Engineer and Chartered Patent Agent, do hereby declare the nature of this invention to be as follows:—

This invention relates to securing devices for removable bridge work and similar use in dentistry. Its object is to provide a strong and simple appliance which will firmly hold saddle plates or other parts in place, and yet permit an easy removal and the tightening of the fastening should it become loose. This invention especially comprises the use of spring fastenings applied to roots or artificial crowns, to which a saddle carrying the teeth may be attached, one of the studs being also appliable in securing a single tooth.

In use the following parts and appliances are employed in preparing and applying these securing devices.

1, a root; 2, the usual band cap for the root; 3, a hollow stud with separate arms. 4, in brief, a spring stud; 5, a cap of platinum or iridium or other suitable material, and, where desired, 6, a cap of smaller size; 7, a circular base-ring of platinum or other suitable material, with, 8, an axial perforation large enough to fit over the platinum cap; 9, a porcelain crown in which may be secured the base-ring and cap; 10, a **U**-shaped or wedge-shaped metal box to form a cap to take over, 11, a **U**-shaped or wedge-shaped spring fastening; that is, a fastening made of a flat piece of spring metal bent into **U**-form with its edges bent in toward each other at the rear, so that it is triangular or wedge-shaped in plan; 12, a crown of gold or other material to which the spring fastening may be soldered or otherwise secured.

In practice the spring stud is to be secured to the root cap. In actual application it will be found that the angle of inclination of a base will vary in different roots. It will, ordinarily, be necessary to file the separate ends of the spring stud, so that the angle may be the same as that of the base to which it is to be attached. This can be done by hand, and by tools now in use. I have, however, invented a tool especially adapted for fitting the spring studs to various roots, and in practice one of the most essential features is the precise adjustment of the spring stud, the cap and the base plate, so that all the parts may be perfectly parallel throughout the attaching devices.

In proceeding to assemble the parts the usual impression is taken in plaster of the capped roots and the parts to be supplied with teeth, the caps being arranged to easily slip off the roots. The inside and pins of the root caps are covered, preferably, with a solution of paraffine dissolved in ether, the impression is varnished, and a model is made in sump or some non-shrinking material. After the model is made it is slightly warmed, so that the root caps can easily be removed and accurately replaced. This model is fastened on the instrument before referred to as my invention, by waxing or other method. This instrument is adjustable in all its parts and is used to set the spring studs perfectly parallel one with another.

[*Price 8d.*]

The tool or instrument which may be, in this instance, termed the soldering-jig comprises a standard, a centering post, which is adjustable, and an adjustable arm on the centering post carrying an adjustable chuck-holder. The adjustable arm together with the chuck-holder may slide up and down on the centering post. The chuck-holder will hold the soldering-chucks, preferably four in number, one for each size of spring stud and for each size of the U-spring. I have deemed it unnecessary to illustrate this instrument or soldering-jig in this application inasmuch as it is the subject of a preceding companion application. The description I have given is sufficient to make it apparent that I have an instrument which enables me to accurately place and manipulate the devices of this invention. By observing the model I determine the proper size stud or spring fastening to use, in what position it should be soldered, and the length it can be given so as not to interfere with the occluding teeth. I select the proper size of stud and the corresponding size of chuck, placing the stud in the opening in the end of the chuck and forcing it down to the bottom. This holds the spring stud firmly and reduces its open end, so that when it is soldered it has the convex or barrel shape shown in the drawing. I bring it to the position on the root cap which it is to occupy, observe the angle to which it must be filed to fit accurately and then remove the chuck with the spring stud in it. With a fine cut gold file I cut the leaves or arms of the spring stud to correspond precisely with the angle of the root cap. I then replace the chuck-holder on the instrument and bring the open end of the stud against the root-cap, and solder them together. During the fusing the wax is melted so that, immediately afterward, I can lift the adjustable arm or chuck-holder, taking away the cap and spring together. I now place the chosen cap in a pair of special plyers, and fit it over the spring stud to determine the precise angle to which it should be filed to fit the root cap accurately around the base of the spring. I then remove the cap and cut it as determined. Then with a special punch I cut a hole of the proper size in a platinum or gold plate. This piece of plate must be a little larger than the root cap to overlap it, especially on the mesial or distal sides, or on the side where the saddle rests. I adapt this, preferably, to the surface of the root cap with a pair of plyers and revolving movement, giving it a perfect adaptation at the base of the capsule. The two are then waxed together and placed on a soldering block where they are strongly united, producing what I call my crown cap. These connected parts are then replaced on the model and each abutment is proceeded with in the same manner. It is obvious that with this instrument they must all stand in perfect alinement one with another. When finished the crown cap is removed and each cap carrying the spring stud is placed on its root.

In applying this securing devices in bridge work I secure the spring stud by the method described on an anterior crown or root. The posterior attachment comprises the U-shaped spring piece soldered on the side of a gold crown or artificial tooth. At one end of the saddle is the crown cap described which takes over the described spring stud. At the other end of the saddle is the U-shaped cap soldered to the end of the saddle and enclosed by the material by which the teeth are fastened to the saddle, so that the cap will take over the U-shaped spring stud closing it completely.

This combined mode of attachment enables me to place the spring studs in precise accordance with the angle of inclination and the position of the crown, and insures and accurate and close fit.

To properly produce and apply this securing device requires distinct inventions in separate tools. I have previously referred to one tool which I use. In insuring the proper action of the saddle in making close connection, as required in using this securing device, I use also a device which forces the saddle up into the soft tissues of the mouth previous to the taking of an impression, so that I am sure of accomplishing the nicest relation of the parts, thus enabling me to properly and efficiently use and apply this securing devices. A tool especially fitted to perform this function is shown in an application of mine now on file.

The securing devices may be modified or reversed. For example, it is obvious that the spring stud may be placed in the crown, and the cap in the root.

I have also invented a modified or U-shaped spring fastening which has a lock formed in its side, that is, a depression adapted to receive a corresponding rib on the cap and lock the two together.

I desire to especially note that these devices are readily repaired. While they are so placed that there is little likelihood of their breaking off, it will be obvious from a study of my system that such parts can be marked and withdrawn and a new fastening device substituted.

So, also, both these spring fastenings can be adjusted should they wear loose, the spring stud by a slight tap on the end and the U-spring by springing it out a little on the side by a pair of plyers.

I have already indicated the special adaptation of my devices to bridge work. The spring studs are so arranged and applied that the saddle may be forced directly up into place and removed by a direct down pull. There is a certain freedom of yielding movement in securing exact location, while at the same time the tightest and cleanest possible joint is secured once the saddle or bridge is in place.

By the use of this spring fastening devices and the manner in which I am thus enabled to apply the bridge work, I am able to retain the contour of the tissues shrunken by absorption of the alveolus, and to exaggerate, if necessary, to give the proper expression to the face. I am also able to avoid the display of gold by thus placing the bridge work, and, to make with porcelain, an artistic and life-like denture. I am also able, in even the cheapest work, to produce a life-like, artistic denture or bridge, or support firmly a vulcanite plate, with or without a saddle. While the bridge is held firmly in place it is easily removable for repair and cleansing and the occasional rest which the abutments need to restore to nominal tone the overstrained surrounding tissues.

I have, while avoiding a recitation of all the details of work which are necessarily involved in the careful application of these devices in every example, endeavoured to demonstrate the careful study and invention involved in the problem of applying to actual service in dentistry spring fastenings, such as will permit a vertical pressure to place the saddle, and, at the same time, provide fastening devices which will permit the bridge to spring into place and be held firmly both laterally and vertically: and yet permit a vertical pull to remove the bridge work.

Dated this 29th day of April 1901.

W. LLOYD WISE,
46, Lincoln's Inn Fields, London, W.C.
Chartered Patent Agent.

COMPLETE SPECIFICATION.

Improvements in Securing Devices for Removable Bridge Work and similar Use in Dentistry.

A communication from abroad by William Everett Griswold, of 423 Mack Block, Denver, Arapahoe County, Colorado, Dentist and Louis Dennison Sweet, of Equitable Building, Denver, Arapahoe County, aforesaid, Capitalist.

I, William Lloyd Wise, of 46, Lincoln's Inn Fields, in the County of London, Consulting Engineer and Chartered Patent Agent, do hereby declare the nature of this invention and in what manner the same is to be performed to be particularly described and ascertained in and by the following statement:—

This invention relates to securing devices for removable bridge work and similar use in dentistry. Its object is to provide a strong and simple appliance which will firmly hold saddle plates or other parts in place, and yet permit an easy removal and the tightening of the fastening should it become loose. This invention especially comprises the use of spring fastenings applied to roots or artificial crowns, to which a saddle carrying the teeth may be attached, one of the studs being also applicable in securing a single tooth.

In the accompanying drawings, the figures of which are generally enlarged views;

Fig. 1 is an elevation, partly in section, of the usual capped root;

Fig. 2 is a detail in elevation of a spring stud;

Fig. 3 is an elevation, partly in section of a spring stud fixed to the cap of a root;

Fig. 4 is a vertical section of a cap for the spring stud, two sizes being illustrated;

Fig. 5 is a plan view of a tooth base-ring;

Fig. 6 is a vertical section of the cap of Fig. 4 and the base-ring of Fig. 5 joined together;

Fig. 7 is a vertical section of the cap and plate of Fig. 6 in place in a crown;

Fig. 8 is an elevation, partly in section, of a root and crown connected by the attaching devices of my invention;

Fig. 9 is a view in perspective of a U-shaped or wedge-shaped box or cap;

Fig. 10 is a view in perspective of a U-shaped or wedge-shaped spring fastening;

Fig. 11 is a top plan view of the wedge-spring box or cap;

Fig. 12 is a perspective showing a modification, and also showing the fastening and cap together;

Fig. 13 is an elevation of a crown with the spring of Fig. 9 attached;

Fig. 14 is a view in perspective of a saddle adapted to be secured to or take over the spring studs of Fig. 15;

Fig. 15 is a view slightly in perspective showing the attaching devices in place for the bridge work; and

Fig. 16 is a view illustrating the use of opposing U-shaped fastenings.

In the drawings, 1 represents (enlarged) a root and 2 the usual band cap. 3 is a hollow stud with separate arms 4, in brief, a spring stud, made, preferably, of a metal which will stand a high heat, and yet retain its elasticity, and which will also resist the action of boiling acids. 5 is a cap of platinum or iridium or other suitable material, and 6 is a cap of smaller size. 7 is a circular base-ring of platinum or other suitable material, with an axial perforation 8 large enough to fit over the cap 5, for example, it being understood that there may be a corresponding size of the cap 6. 9 is an ordinary porcelain crown in which is secured a base-ring and cap, that is, the complementary parts 7 and 5 joined together by the usual process of soldering or otherwise.

11 is a U-shaped or wedge-shaped spring fastening, that is, a flat piece of spring metal bent into U-form with its edges bent in toward each other at the rear so that it is wedge-shaped in plan, as illustrated, for example, for a similar part in Fig. 11, and so that the sides will have a yielding or spring effect. 10 is a piece of similar metal backed so as to form a complementary box or cap adapted to take over the securing stud 11. 12 is a crown of gold or other material to which is soldered, or otherwise secured, the spring fastening 11. The spring studs 3 and 11 are shown as secured in place on Fig. 14, which is a portion of a jaw and teeth.

In practice the spring stud 3 is to be secured to the cap 2. In actual application it will be found that the angle of inclination of a base will vary in different roots. It will, ordinarily, be necessary to file the separate ends of the spring stud 3, so that the angle may be the same as that of the base to which it is to be attached. This can be done by hand, and by tools now in use. My correspondent has however, invented a tool especially adapted for fitting the spring studs to various roots, and in practice one of the most essential features is the precise adjustment of the spring stud, the cap and the base plate, so that all the parts may be perfectly parallel throughout the attaching devices.

In proceeding to assemble the parts the usual impression is taken in plaster of the capped roots and the parts to be supplied with teeth, the caps being arranged to easily slip off the roots. The inside and pins of the root caps are covered, preferably, with a solution of paraffine dissolved in ether, the impression, is varnished, and a model is made in some non-shrinking material. After the model is made it is slightly warmed, so that the root caps can easily be removed and accurately replaced. This model is fastened on the instrument before referred to as my correspondent's invention, by waxing or other method. This instrument is adjustable in all its parts and is used to set the spring studs perfectly parallel one with another.

The tool or instrument which may be, in this instance, termed the soldering-jig comprises a standard, a centering post, which is adjustable, and an adjustable arm on the centering post carrying an adjustable chuck-holder. The adjustable arm together with the chuck-holder may slide up and down on the centering post. The chuck-holder will hold the soldering-chucks, preferably four in number, one for each size of spring stud and for each size of the U-spring. I have deemed it unnecessary to illustrate this instrument or soldering-jig in this application inasmuch as it is the subject of a preceding companion application No. 14357 of 1900. The description I have given is sufficient to make it apparent that I have an instrument which enables me to accurately place and manipulate the devices of my invention. By observing the model I determine the proper size stud or spring fastening to use, in what position it should be soldered, and the length it can be given so as not to interfere with the occluding teeth. I select the proper size of stud and the corresponding size of chuck, placing the stud in the opening in the end of the chuck and forcing it down to the bottom. This holds the spring stud firmly and reduces its open end, so that when it is soldered it has the convex or barrel shape shown in the drawing. I bring it to the position on the root cap which it is to occupy, observe the angle to which it must be filed to fit accurately and then remove the chuck with the spring stud in it. With a fine cut gold file I cut the leaves or arms of the spring stud to correspond precisely with the angle of the root cap. I then replace the chuck-holder on the instrument and bring the open end of the stud against the root-cap, and solder them together. During the fusing the wax is melted so that, immediately afterward, I can lift the adjustable arm or chuck-holder, taking away the cap and spring together. I now place the chosen cap, say 5, in a pair of special plyers, and fit it over the spring stud to determine the precise angle to which it should be filed to fit the root cap accurately around the base of the spring. I then remove the cap and cut it as determined. Then with a special punch I cut a hole of the proper size in a platinum or gold plate. This piece of plate must be a little longer than the root cap to overlap it, especially on the mesial or distal sides, or on the side where the saddle rests. I adapt this, preferably, to the surface of the root cap with a pair of plyers and revolving movement, giving it a perfect adaptation at the base of the capsule. The two are then waxed together and placed on a soldering block where they are strongly united, producing what I call my crown cap, illustrated at Fig. 6. These connected parts are then replaced on the model and each abutment is proceeded with in the same manner. It is obvious that with my instrument they must all stand in perfect alinement one with another. When finished the crown cap is removed and each cap carrying the spring stud is placed on its root.

In Figs. 14, 15 and 16, I have illustrated the application of the securing devices in bridge work. The spring stud 3 has been secured by the method described on an anterior crown or root. The posterior attachment comprises the U-shaped spring piece 11 soldered on the side of a gold crown or artificial tooth. At one end of the saddle is the crown cap 7 which takes over the spring stud 3. At the other end of the saddle is the spring cap 10 soldered to the end of the saddle and enclosed by the material by which the teeth are fastened to the saddle. The cap 10 takes over the spring stud 11, closing it completely.

This combined mode of attachment enables me to place the spring studs in precise accordance with the angle of inclination and the position of the crown, and insures an accurate and close fit.

To properly produce and apply my securing device requires distinct inventions in separate tools. I have previously referred to one tool which I use. In insuring the proper action of the saddle in making close connection, as required in using my securing device, I use also a device which forces the saddle up into the soft tissues of the mouth previous to the taking of an impression, so that I am sure of accomplishing the nicest relation of the parts, thus enabling me to properly and efficiently use and apply my securing devices. A tool especially fitted to perform this function is shown in an application of mine now on file, No. 14358 of 1900.

The securing devices may be modified or reversed. For example, it is obvious that the spring stud may be placed in the crown, and the cap in the root.

In Fig. 12, I have illustrated a modified U-shaped or wedge-shaped spring fastening which has a lock formed in its side, that is, a depression adapted to receive a corresponding rib on the cap and lock the two together. The figure shows the fastening 15 and its cap 16 together, and in Fig. 16 the fastening is shown in application to opposing crowns. This is especially applicable in case it is preferred to put shell crowns over teeth ground down, instead of amputating crowns. It is obvious that when the cap is slipped over the wedge-shaped spring the locking ribs spring into place and the whole is held securely throughout the width of fastening and is particularly held against an ordinary vertical displacement.

I desire to especially note that the devices are readily repaired. While they are so placed that there is little likelihood of their breaking off, it will be obvious from a study of the system that such parts can be marked and withdrawn and a new fastening device substituted.

So, also, both these spring fastenings can be adjusted should they wear loose, the spring stud 3 by a slight tap on the end and the U-spring by springing it out a little on the side by a pair of plyers.

I have already indicated the special adaptation of the devices to bridge work. The spring studs are so arranged and applied that the saddle may be forced directly up into place and removed by a direct down pull. There is a certain freedom of yielding movement in securing exact location, while at the same time the tightest and cleanest possible joint is secured once the saddle or bridge is in place.

By the use of my spring fastening devices and the manner in which I am thus enabled to apply the bridge work, I am able to retain the contour of the tissues shrunken by absorption of the alveolus, and to exaggerate, if necessary, to give the proper expression to the face. I am also able to avoid the display of gold by thus placing the bridge-work, and to make with porcelain, an artistic and life-like denture. I am also able, in even the cheapest work, to produce a life-like, artistic denture or bridge, or support firmly a vulcanite plate, with or without a saddle. While the bridge is held firmly in place it is easily removable for repair and cleansing and the occasional rest which the abutments need to restore to nominal tone the overstrained surrounding tissues.

I have, while avoiding a recitation of all the details of work which are necessarily involved in the careful application of these devices in every example, endeavored to demonstrate the careful study and invention involved in the problem of applying to actual service in dentistry spring fastenings, such as will permit a vertical pressure to place the saddle, and, at the same time, provide fastening devices which will permit the bridge to spring into place and be held firmly both laterally and vertically; and yet permit a vertical pull to remove the bridge work.

Having now particularly described and ascertained the nature of the said invention, and in what manner the same is to be performed, I declare that what I claim is:—

1. In dental bridge-work, the combination of a spring stud secured to or engaging the cap of a root, a spring stud secured to the side of a crown, and complementary attaching parts on opposite ends of the saddle.
2. The combination of a dental fastening substantially U-shaped in elevation and wedge-shaped in cross-section, and a corresponding reverse cap or cover.
3. A dental spring fastening substantially U-shaped in elevation and wedge shaped in cross section, and having a lock formed in its sides.
4. The improved securing devices for removable bridge work and similar use in dentistry shewn in and described with reference to the annexed drawings.

Dated this 28th day of January 1902.

W. LLOYD WISE
46, Lincoln's Inn Fields, London, W.C.
Chartered Patent Agent.

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Fig. 1.

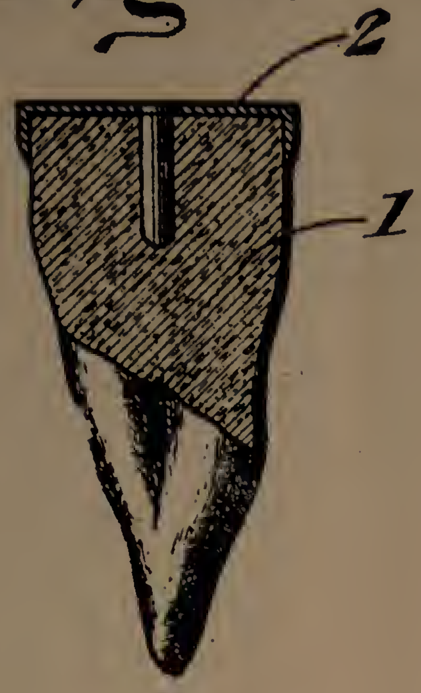


Fig. 2.

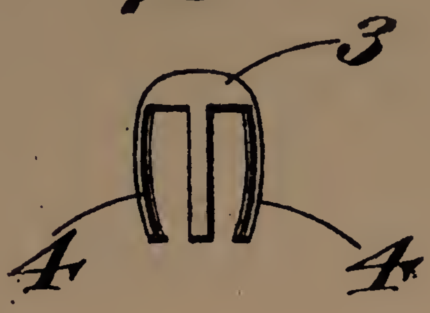


Fig. 3.

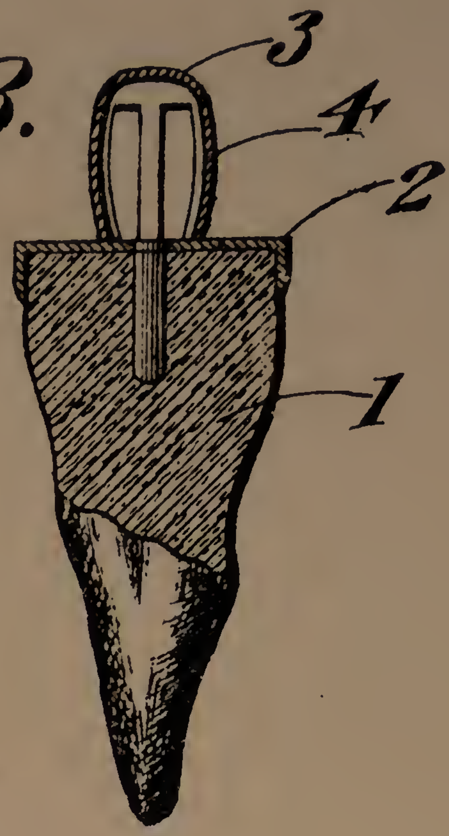


Fig. 4.

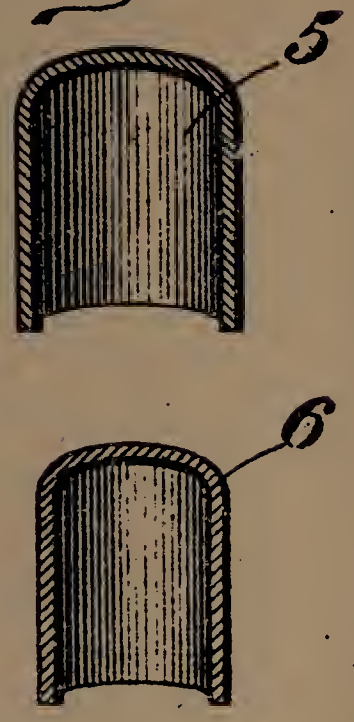


Fig. 5.

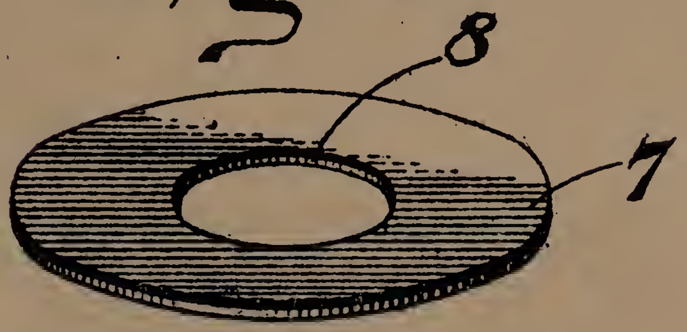


Fig. 7.

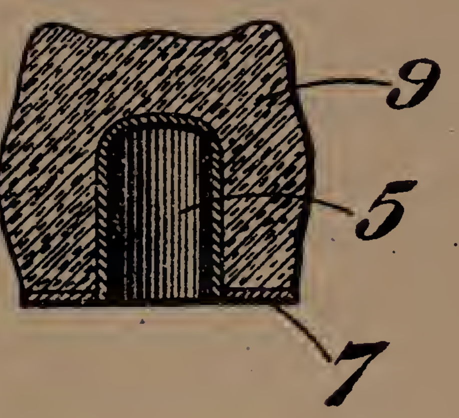


Fig. 6.

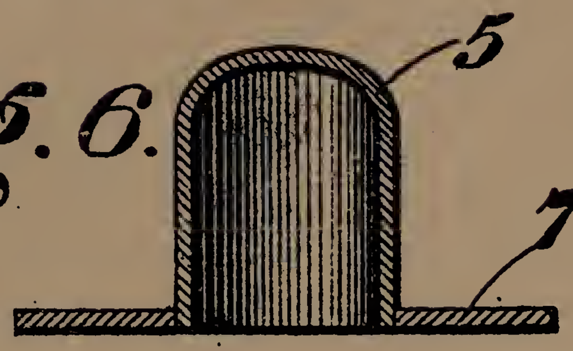


Fig. 8.

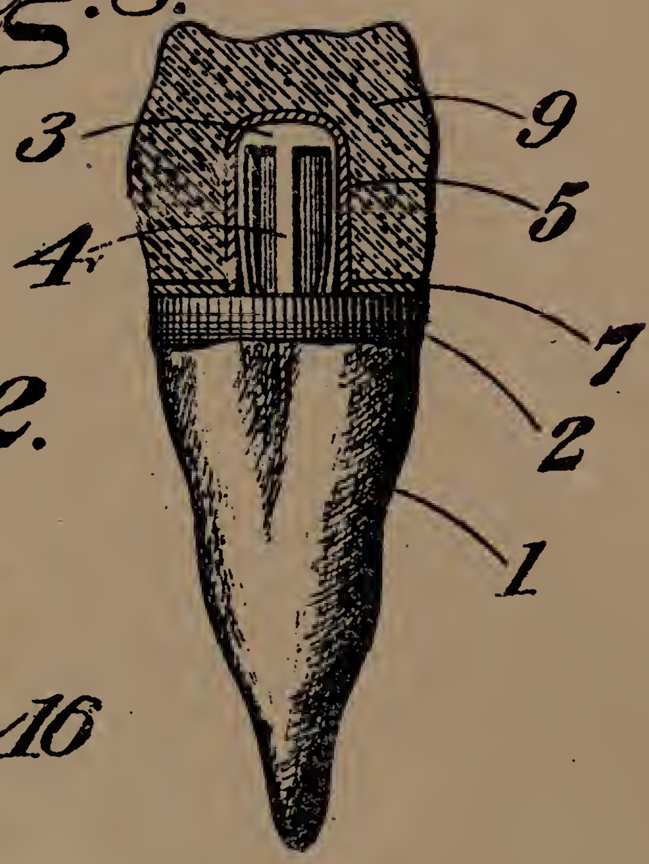


Fig. 9.

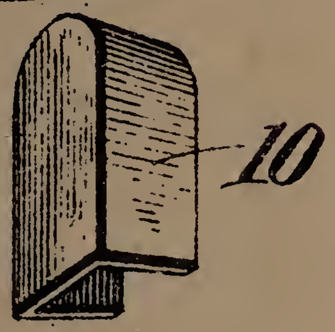


Fig. 11.

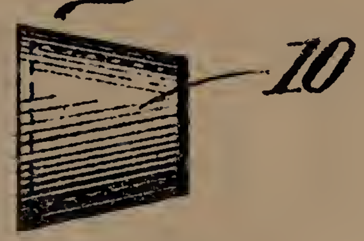


Fig. 12.

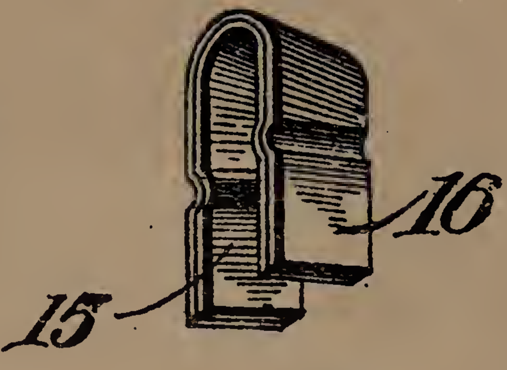


Fig. 10.

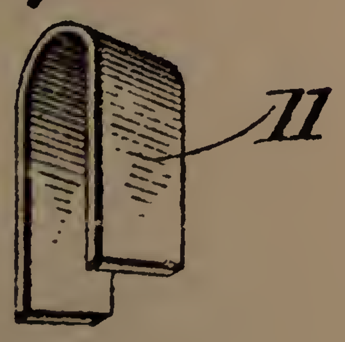


Fig. 13.

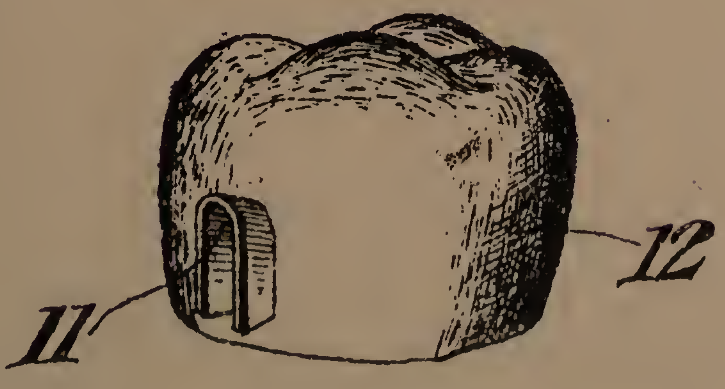


Fig. 14.

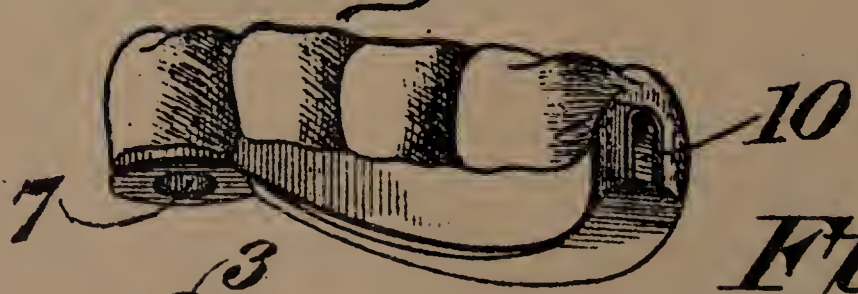


Fig. 15.

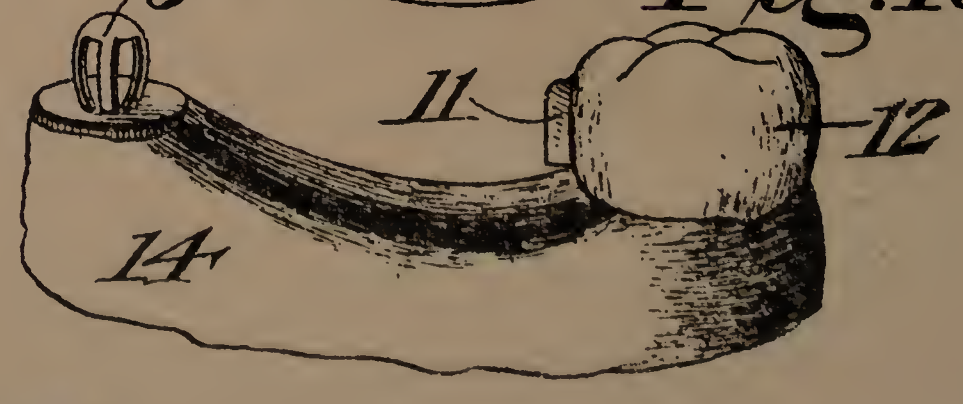
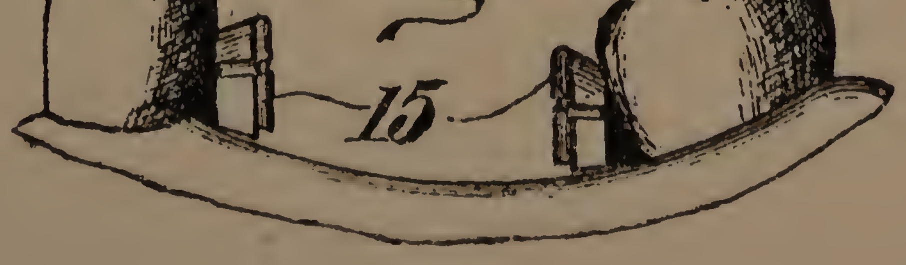


Fig. 16.



[This Drawing is a reproduction of the Original on a reduced scale.]

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